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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/525,468

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Thomas Genger

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CONNOLLY BOVE LODGE & HUTZ, LLP
P O BOX 2207
WILMINGTON, DE 19899

EXAMINER

KEYS, ROSALYND ANN

ART UNIT

PAPER NUMBER

1621

MAIL DATE

DELIVERY MODE

12/14/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/525,468

Applicant(s)

GENGER ET AL.

Examiner

Rosalynd Keys

Art Unit

1621

– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 November 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,6-8,10 and 12-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,6-8,10 and 12-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

Status of Claims

1. Claims 1, 3, 6-8, 10, and 12-20 are pending.

Claims 1, 3, 6-8, 10, and 12-20 are rejected.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 6, 2007 has been entered.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 12 is indefinite because the Applicants refer to the oxidizing agent and the starting material as both the higher-boiling reactant and the lower-boiling reactant.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 3, 6, 8, 10, 12, 13, 15, 17 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Rapoport et al. (US 3,957,876).

Rapoport et al. teach a process for the zoned oxidation of cyclohexane wherein an oxygen containing gas is fed to each oxidation zone (see entire disclosure, in particular column 2, line 14-39; column 3, lines 5-35; and column 4, lines 1-54). The cyclohexane is fed downwardly and the oxidizing gas is fed upwardly (see column 2, lines 19-26). Unreacted cyclohexane is recycled (see column 2, lines 30-32 and lines 57-62). The oxidizing gas contains molecular oxygen (see column 2, lines 19-23). A cobalt catalyst is used (see column 2, lines 36-66). The oxidation zones are maintained at temperatures ranging from 140° to 170°C (see column 3, lines 19-22). Recycled gas is introduced to provide mild oxidizing conditions throughout the tower (see column 4, lines 34-54). Rapoport et al. teach the use of a reactor containing 21 equally spaced trays (see column 4, lines 1-6). The reactor contains a bottom region, a top region and a reaction zone between the top and bottom region (see figure). The reactor is a rectification column, wherein both reaction and separation by distillation are occurring (see column 4, lines 1-59).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 1, 3, 6-8, 10, 12-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over S. M. Ciborowski et al. (US 3,349,007) in view of Rapoport et al. (US 3,957,876) and Luebke et al. (US 5,449,501) and further in view of W. W. Crouch et al. (US 2,931,834) and Richard J. Lewis (Hawley's Condensed Chemical Dictionary, twelfth edition, 1993, page 1139).

S. M. Ciborowski et al. teach a process for the oxidation of cyclohexane (see entire disclosure, in particular column 1, lines 10-27).

S. M. Ciborowski et al. fail to teach carrying out the oxidation in the presence of a catalyst and introducing the oxidizing agent in at least two substreams.

Rapoport et al. teach a process for the catalytic oxidation of cyclohexane wherein an oxygen containing gas is fed as more than one substream (see entire disclosure, in particular column 2, line 14-39~ column 3, lines 5-35, and column 4, lines 18-54).

The use of a catalyst and more than one substream as taught by Rapoport et al. in the process of Luebke et al. would have been obvious because Rapoport et al. has shown that the use of a catalyst and the addition of an oxidizing gas to more than one tray in an oxidation reaction is known and thus is recognized as part of the ordinary capabilities of one skilled in the art.

S. M. Ciborowski et al. fail to teach carrying out the oxidation in a rectification column.

Luebke et al. teach an apparatus for catalytic distillation according to the claimed invention (see entire disclosure, in particular figure 1; column 4, lines 12-60 and column 7, lines 4-65). It is taught that the subject apparatus can be used to perform any reaction which is amenable to catalytic distillation (see column 7, lines 4-6). In general this includes any exothermic reaction which occurs primarily in the liquid phase and produces a reaction product which is less volatile than the feed compounds (see column 7, lines 6-9).

One having ordinary skill in the art at the time the invention was made would have found it obvious to operate the process of S. M. Ciborowski et al. in the apparatus of Luebke et al. since Luebke et al. teach that their apparatus may be used in any exothermic reaction which occurs primarily in the liquid phase and produces a reaction product which is less volatile than the feed compounds. The skilled artisan would be motivated to operate the process of S. M. Ciborowski et al. in the apparatus of Luebke et al., since it would allow S. M. Ciborowski et al. to simultaneously perform their reaction and separation steps.

S. M. Ciborowski et al. fail to teach that water is by-produced in the reaction and that it is withdrawn from the reaction in the reaction zone or in the top region.

Crouch et al. teach a process for the oxidation of cyclohexane (see entire disclosure). It is taught that water is formed during the reaction and that it is to be removed (see column 3, lines 5-10).

One having ordinary skill in the art at the time the invention was made would have found it obvious that water formed in the reaction of S. M. Ciborowski et al. , since Crouch et al. teach that water is produced during the oxidation of cyclohexane. The skilled artisan would have also found it obvious to remove such water, since Crouch et al. also teach that it is desirable to remove the water produced in the oxidation (see column 1, lines 48-50).

S. M. Ciborowski et al. in view of Luebke et al., fail to teach the use of 20-40 theoretical plates in the rectification column.

Lewis teaches that as many as 100 theoretical plates are used in laboratory and industrial operation (see page 1139). Lewis also discloses that the effectiveness of a fractionating column is measured in terms of theoretical plates.

One having ordinary skill in the art at the time the invention was made would have been motivated to use as many as a hundred theoretical plates, as disclosed by Lewis, in the apparatus of Luebke et al. for use in the process of S. M. Ciborowski et al., depending upon the degree of separation desired.

S. M. Ciborowski et al. do not teach the claimed temperature range. However, the Examiner believes that one having ordinary skill in the art would be able to determine a suitable reaction temperature to allow one to obtain optimum results.

The examiner considers the limitations of claims 12, 14, 19 and 20 to be within the level of one having ordinary skill in the art. For example the Applicants have simply used a bottom evaporator and phase separator in the manner in which they are known to be used.

Response to Amendment

Rejection of claims 1, 3, 6, 8, 12, 13, 15, and 17 under 35 U.S.C. 102(b) as being anticipated by W. Gey et al. (US 3,439,041)

11. The rejection of claims 1, 3, 6, 8, 12, 13, 15, and 17 under 35 U.S.C. 102(b) as being anticipated by W. Gey et al. (US 3,439,041) is withdrawn, due the amendment to claim 1, which requires the reaction apparatus to be a rectification column.

Rejection of claims 1, 3, 6-8, 10, and 12-20 under 35 U.S.C. 103(a) as being unpatentable over W. Gey et al. (US 3,439,041) alone or in view of Rapoport et al. (US 3,957,876) and Richard J. Lewis (Hawley's Condensed Chemical Dictionary, twelfth edition, 1993, page 1139)

12. The rejection of claims 1, 3, 6-8, 10, and 12-20 under 35 U.S.C. 103(a) as being unpatentable over W. Gey et al. (US 3,439,041) alone or in view of Rapoport et al. (US 3,957,876) and Richard J. Lewis (Hawley's Condensed Chemical Dictionary, twelfth edition, 1993, page 1139) is withdrawn, due the amendment to claim 1, which requires the reaction apparatus to be a rectification column.

Response to Arguments

Rejection of claims 1, 3, 6, 8, 10, 12, 13, 15, 17 and 18 under 35 U.S.C. 102(b) as being anticipated by Rapoport et al. (US 3,957,876)

13. Applicant's arguments filed October 18, 2007 have been fully considered but they are not persuasive.

The Applicants argue that Rapoport et al. is not a reactive distillation. The Examiner disagrees. In the process of Rapoport et al. both reaction and separation by distillation are occurring (see column 4, lines 1-59). This is confirmed by Chen et al. (US 2004/0162445 A1), which refers to the apparatus of Rapoport et al. as a distilling tower reactor (see paragraph 0006).

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rosalynd Keys whose telephone number is 571-272-0639. The examiner can normally be reached on M, R & F 5:30-7:30 am & 1-5 pm; T & W 5:30 am-4 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yvonne Eyler can be reached on 571-272-0871. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Rosalynd Keys/
Primary Examiner
Art Unit 1621

December 8, 2007